



RV Generator Load Management Basics

How Battery Chargers and Other Base Loads Affect Your Generator

Auto Genstarts Systems and Safety Tips

Mysterious Generator Startups or Shutdowns? Elementary!



Sounds like a case for Sherlock Holmes. You say there's a problem with your generator? It shuts down or starts by itself at unexplained times? But thorough testing and trouble-shooting fail to uncover a problem. What's wrong with your generator?

Maybe nothing – if it's in a coach equipped with an automatic generator start/stop system. These control systems, most often installed in coaches with Onan QD diesel generators, are designed to start and stop the generator automatically based on battery voltage and/or air-conditioner demand. The control panels are often combined with the inverter/charger controls inside the

coach and are connected to the generator remote control via the coach wiring harness. The benefit to you is that you don't have to monitor your battery condition when using the inverter, and you won't be stranded without enough battery life to start the generator.

But if you aren't aware of the auto genstart feature, or don't know how it works, the generator may seem to be malfunctioning, when it's actually doing exactly what it should.

Even if you don't experience unexplained shutdowns, it's a good idea to become familiar with your control panel to see whether the coach is equipped with an automatic start/stop feature and to learn how to control it.

DON'T OVERLOAD YOUR GENERATOR!

- ◆ Battery charging is an "invisible" base load – you may not realize it is applied because it starts automatically.

- ✓ Be aware of how large your "invisible" base load can be (per chart 1).
- ✓ Air conditioners need "reserve" power to start up. Too much base load can prevent air conditioner starting (see note below).

- ◆ Battery chargers replenish power drained from:

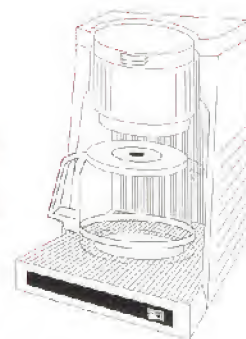
- ✓ Inverter loads when 120 volts AC is not present – such as microwave, lamps, TV/VCR, stereo, refrigerator or icemaker.
- ✓ DC loads such as lights, pumps, fans or slide-outs.
- ✓ Engine starting
- ✓ Generator starting

- ◆ Chart 1 shows the power required from the generator for battery charging only. In addition to battery charging, other AC base loads may include:

- ✓ Refrigerator / ice maker
- ✓ Coffeemaker

- ✓ Microwave oven
- ✓ Toaster
- ✓ Lamps
- ✓ TV/VCR or stereo

- ◆ Manage your electrical loads by adjusting battery charge rates to best suit your needs. Charge rates are usually adjustable – consult your inverter/charger manual or manufacturer.



Note: Each air conditioner typically draws from 1400 to 2400 watts (11–20 amps), depending upon size and operating conditions (more power is needed at high temperature or humidity). During start-up, air conditioners can draw 3 – 4 times that amount.



Battery Charging Loads

| Inverter/Converter Size (Watts) | Battery Charger Max Output (14vdc) | Amps Required From Generator (at 120VAC) | Watts | Equivalent Appliance Load Example |
|--|---|---|--------------|--|
| 1000 | 50 Amps | 12A | 1440 | Hi-efficiency air cond or microwave |
| 1500 | 75 Amps | 16A | 1920 | Hi-efficiency air cond plus microwave |
| 2000 | 100 Amps | 21A | 2520 | 11000 air cond plus microwave |
| 2500 | 120 Amps | 26A | 3120 | 13500 air cond plus microwave |
| 3000 | 140 Amps | 28A | 3360 | 11000 + 13500 air conditioners |

Example: a 2000 watt inverter running at 100A battery charge capacity creates the same load as an 11000 BTU air conditioner plus a microwave oven.

Chart 1

SAFETY CONSIDERATIONS

- ◆ Operate your coach only if it has a properly functioning CO monitor and alarm.
- ◆ Always disable auto start systems:



While re-fueling



For genset service



For storage or long-term parking

Coach owners should ask their coach dealer for training on how to operate auto-starting systems as well as how to adjust battery charger output. If the dealer can't help, the owner should contact the inverter/charger or control manufacturer.

Battery Charging Times

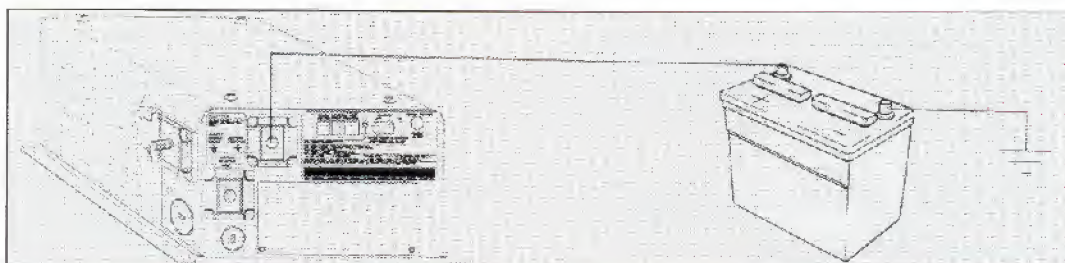
Table is for a 100A battery charger (typical 2000 W inverter) - pulling 21A (2520 watts) from generator.

| Battery Bank Size (Amp hours) | Hours that a 100A battery charger must run to reach float rate at this % of battery charge. | | | | |
|----------------------------------|--|------|-----|------|-------------|
| | 80% | 60% | 40% | 20% | 0% (11 vdc) |
| 100 | 0.3 | 0.7 | 1 | 1.3 | 1.6 |
| 200 | 0.6 | 1.4 | 2 | 2.6 | 3.2 |
| 400 | 1.2 | 2.8 | 4 | 5.2 | 6.4 |
| 600 | 1.8 | 4.2 | 6 | 7.8 | 9.6 |
| 800 | 2.4 | 5.6 | 8 | 10.4 | 12.8 |
| 1000 | 3 | 7 | 10 | 13 | 16 |
| 1200 | 3.6 | 8.4 | 12 | 15.6 | 19.2 |
| 1500 | 4.5 | 10.5 | 15 | 19.5 | 24 |

Chart 2

IT TAKES TIME TO RECHARGE YOUR BATTERIES!

- ◆ Chart 2 shows how long a 100A charger must run before reaching float rate. Charge rate begins to taper off earlier.
- ✓ Example: using a 100 amp battery charger, a 600 amp-hour battery bank at 60% charge level must be charged for 4.2 hours before reaching float rate.
- ◆ Chart assumes no other DC loads are on. If DC lights, pumps or fans are also operating, charge time will be longer. If too many DC loads are applied, the charger may never catch up with the batteries!
- ◆ Large battery charge loads limit the number of other appliances (like air conditioners) that can operate on generator power.
- ◆ AC loads powered through the inverter lengthen charge time due to power sharing.
Consult your inverter/charger manual or manufacturer for charge rate control.
- ◆ Poor batteries, cables or connections also lengthen charge time.
- ◆ **Manage electrical loads to get the most from your generator and electrical system.**





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